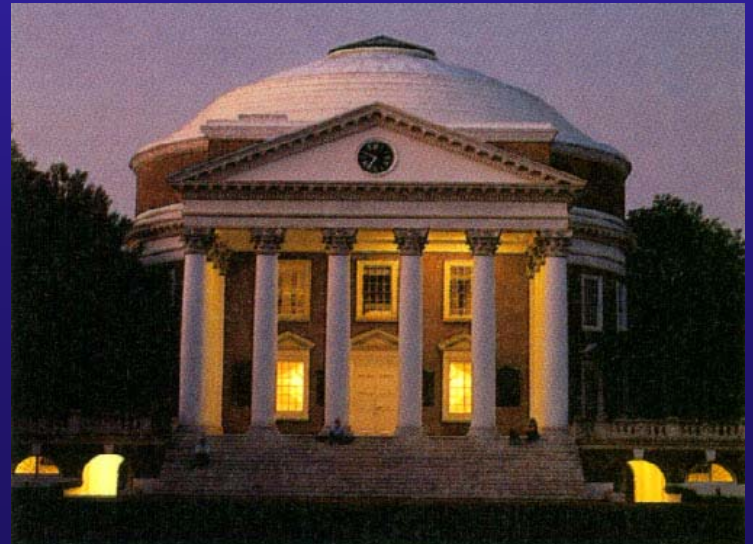


# Preventing Blood and Body Exposures

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# **Topics covered:**

**I. The cost of blood exposures**

**II. Data on blood exposures**

**III. Review of OSHA requirements and  
Standard Precautions**

**IV. Review of personal protective equipment  
to prevent body fluid exposures**

# I. The Cost of Blood Exposures



**HIV**



**HCV**

# *Occupational HIV infection in firefighter/ paramedic*



## Steve Derrig

- 36-year-old married father of two from Akron, OH
- Worked for 9 years as firefighter/paramedic
- In 2000, discovered he was infected with HIV

## Steve Derrig (cont.)



- Didn't recall any sharps injuries, but did remember numerous instances of massive blood exposures to face and arms; routinely wore gloves, but not eye protection
- HIV drug therapy costs \$1,500/ month
- Left job as firefighter/ paramedic because of risk to immune system
- Received workers' compensation settlement; considered "40% impaired"

## *How can emergency or rescue workers be better protected? Steve suggests:*



- Regular testing for HIV and hepatitis: “If I had had an annual test for HIV and my infection was detected earlier, it might not have progressed to the critical stage it reached in March 2000. Having undetected HIV also put my wife and children at risk.”
- Use of personal protective equipment and exposure reporting need to be taken much more seriously



# *Occupational HCV infection in nurse*

## Diane Mawyer, RN



- Married mother of one
- OR nurse for 5 years
- Director of local blood bank from 1981-1994
- Diagnosed with HCV in 1993
- While performing blood drawing, had daily contact with donors' blood (as many as 20 a day) from 1981-1985, before glove use became standard practice

# Diane Mawyer, RN *(cont.)*



- She has required two liver transplants and a kidney transplant
- Is now on dialysis 3x's a week
- She estimates her treatment costs at close to \$1 million so far



# Frequency of Percutaneous Injuries and Mucocutaneous Exposures to Blood and Body Fluids

EPINet multihospital surveillance database

- 26 percutaneous injuries (PIs) per 100 occupied beds (teaching hospitals)
- 18 PIs per 100 occupied beds (non-teaching hospitals)
- .29 mucocutaneous exposures *reported* for each PI reported (note, however, that many blood & body fluid exposures likely go unreported)
- An estimated 384,325 PIs occur in U.S. each year (this includes correction factor for underreporting applied)
- An estimated 146,005 mucocutaneous exposures occur in U.S. annually (does not *include* underreporting correction factor)

# Occupational Exposure to HCV: Infection Rates By Type of Exposure

## SIROH-EPINet, Italy, January 1994 - May 1998

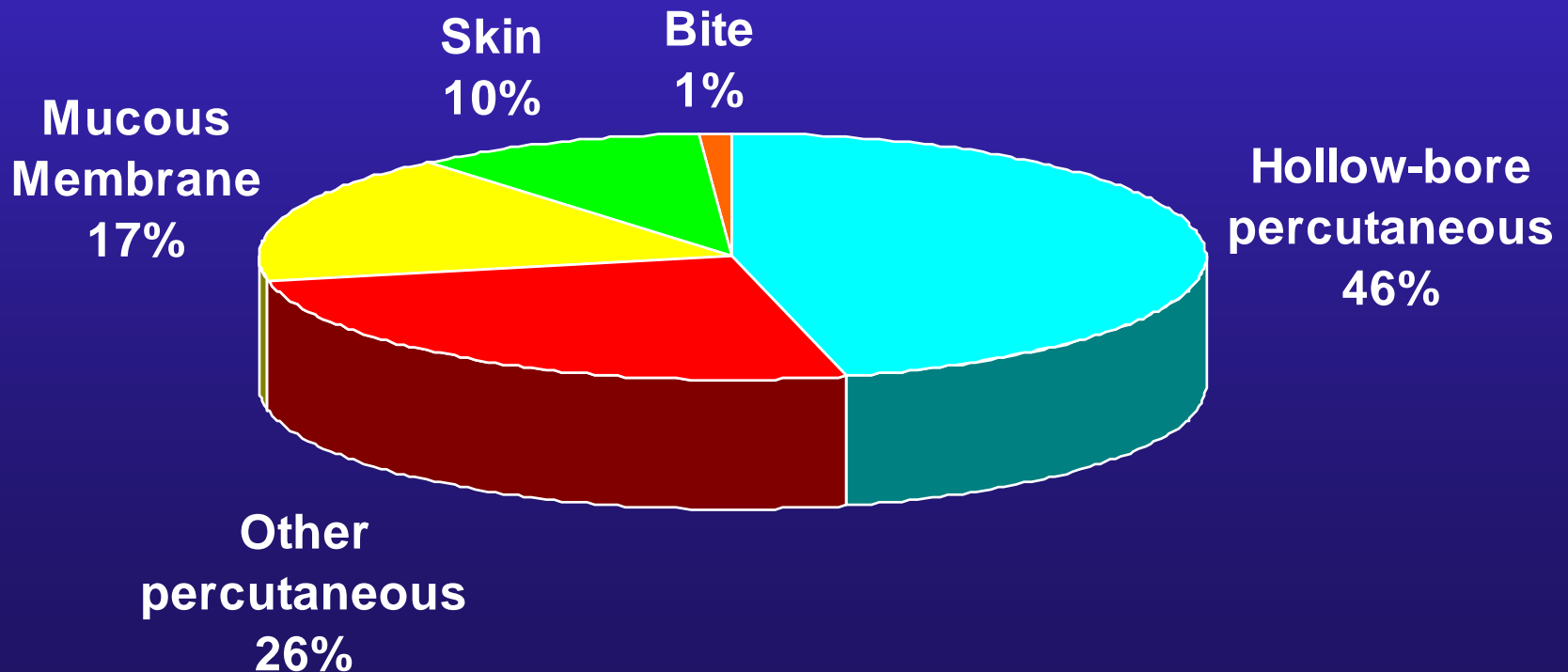
EXPOSURE TYPE	INFECTIONS	EXPOSURES	RATE (%)
Blood-filled needle	11	1301	.84
Non-blood-filled needle	1	631	.16
Solid sharp	0	987	0
Mucous membrane*	2	557	.36
Non-intact skin	0	473	0

*\*both conjunctival*

# NaSH

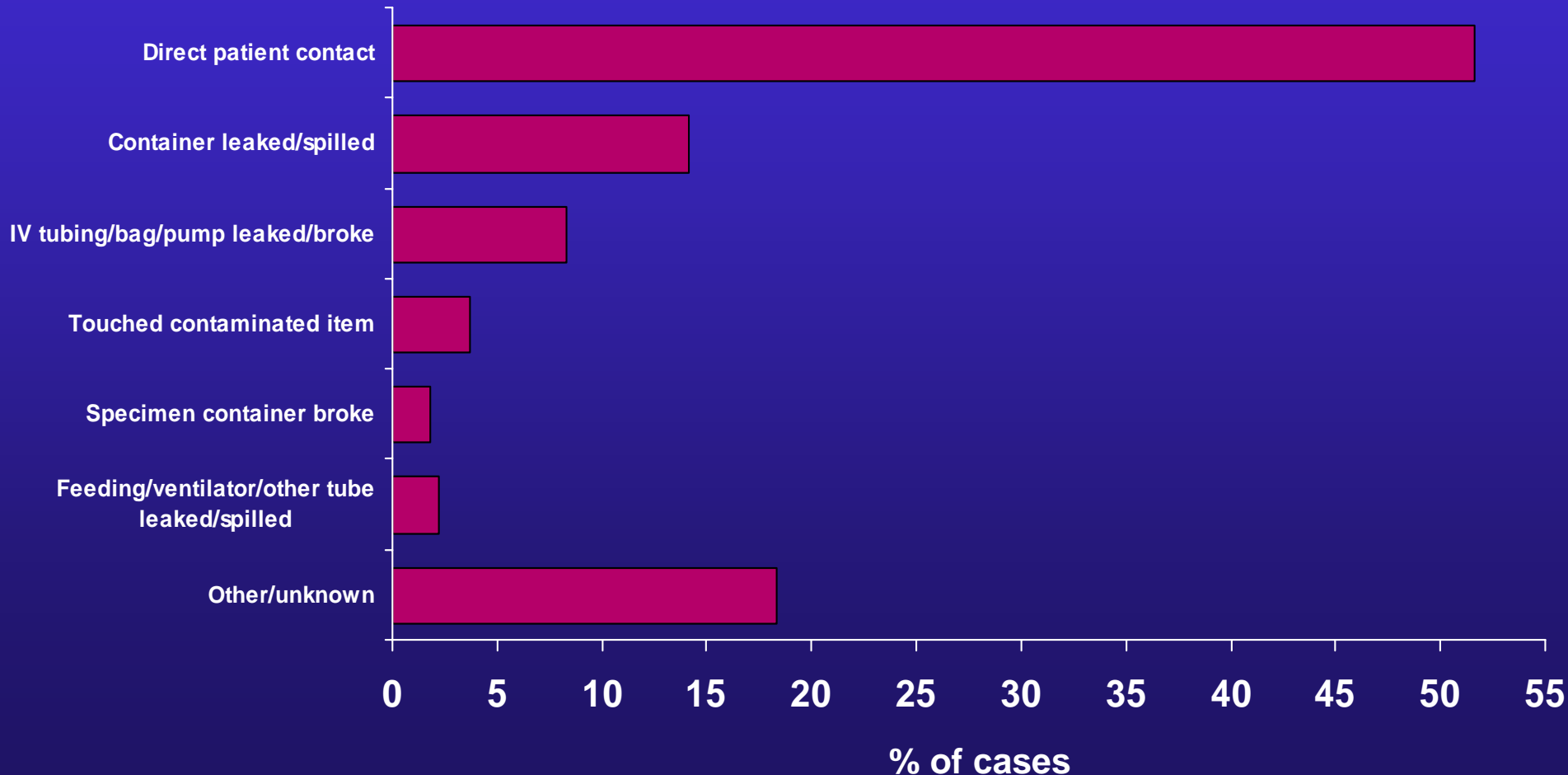
National Surveillance System for Hospital Healthcare Workers, Centers for Disease Control and Prevention)

## Type of Occupational Exposures to HCV (n = 455)



# Mechanism of Blood and Body Fluid Exposures

EPINet, 84 hospitals, 1993-2000, cases=23,692

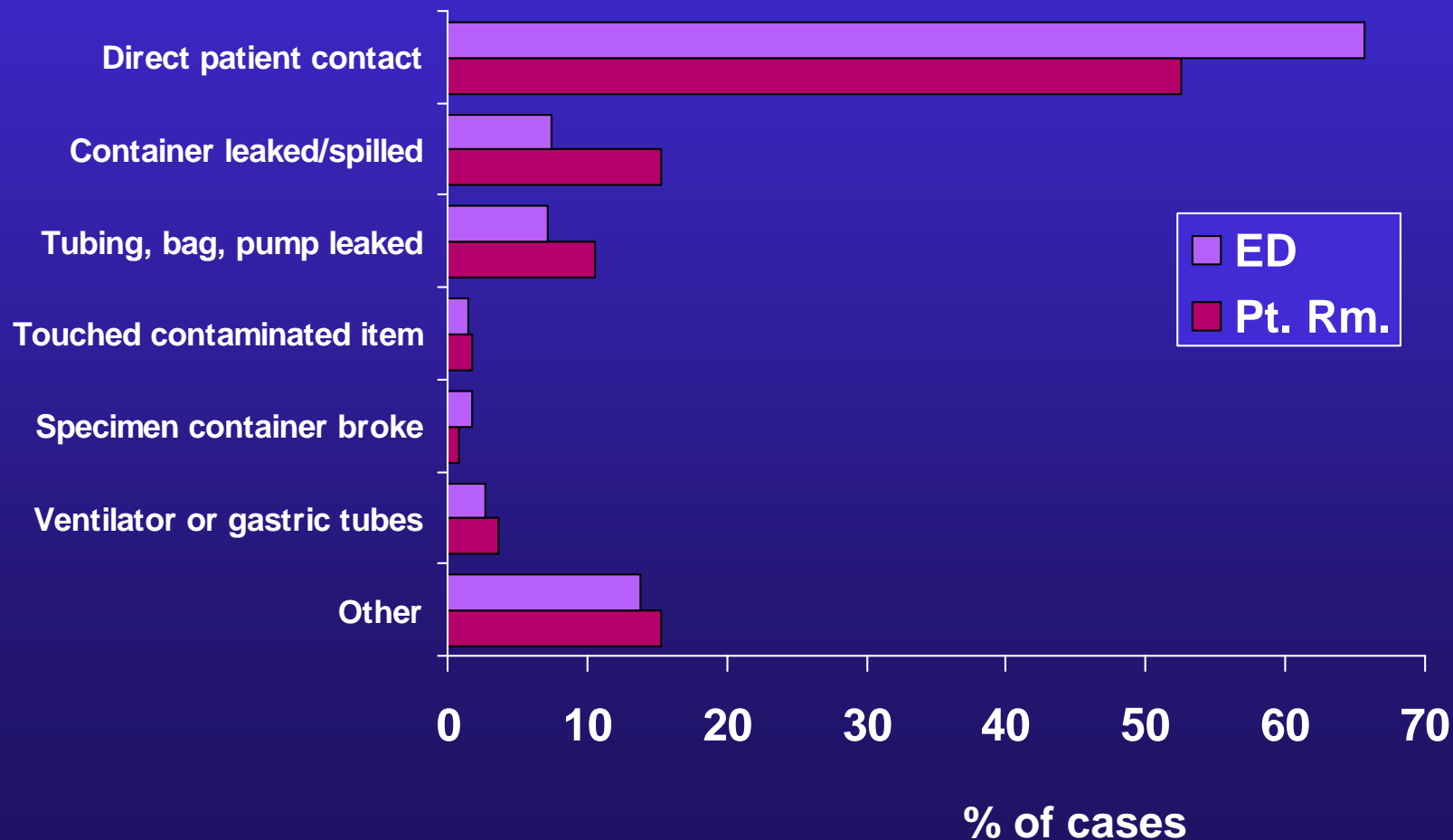


# **EPINet Data on Mucocutaneous Exposure Shows:**

- **About half of these exposures were caused by direct patient contact, which can be prevented in most cases by use of appropriate personal protective equipment**
- **In about half of cases, a medical product or device served as the vehicle of exposure, for example: blood pumping and infusion equipment, blood bags, irrigation devices, suction canisters**
- **All such equipment should be evaluated for safety features; junctions in tubing segments should have positive locking mechanism (not friction fit); blood pumping equipment should have automatic shut-off valve if pressure exceeds safe level**

# Mechanism of Blood and Body Fluid Exposures in Emergency Department vs. Patient Rooms

U.S. EPINet, 1996-2000, ED cases=338; Patient Rm. Cases= 1,365





# Bloodborne Pathogens Standard

(29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens)

## Review of Requirements

Major Provisions by Paragraph

- c) Exposure Control Plan (ECP)
- d) Engineering and Work Practice Controls
  - Personal Protective Equipment (PPE)
- e) HIV and HBV Research Labs
- f) Vaccination, Post-Exposure Follow-up
- g) Labeling and Training
- h) Recordkeeping

# **Engineering and Work Practice Controls: 1910.1030(d)**

**Employers must select and  
implement appropriate  
engineering controls to reduce or  
eliminate employee exposure.**

**“Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used.”**

CPL 2-2.44D

# Engineering and Work Practice Controls

- Selection is dependent on the employer's exposure determination.
- The employer must:
  - Identify worker exposures to blood and OPIM
  - Review all processes and procedures with exposure potential
  - Re-evaluate when new processes or procedures are being used

# **Engineering and Work Practice Controls (con't)**

- **Evaluate available engineering controls (safer medical devices)**
- **Train employees on safe use and disposal**
- **Implement use of appropriate engineering controls/devices**

# **Standard Precautions**

- **Developed in 1996 to protect health care workers and patients from infectious diseases in the health care setting**
- **Synthesize Universal Precautions and Body Substance Isolation**
- **Apply to all body fluids, except sweat**
- **Designed to reduce transmission risk from recognized and unrecognized sources**



# Elements of Standard Precautions

- Handwashing
- Use of appropriate barrier precautions
- Care of patient-care equipment
- Environmental control
- Linen care
- Patient placement

# Universal Precautions vs. Standard Precautions

## Standard Precautions...

- Designed to protect health care workers and patients
- Apply to all body fluids, except sweat
- Developed to reduce transmission of all infectious diseases, not just bloodborne pathogens

# Postexposure Management

## Evaluation of the Exposure

- Type of exposure
  - Percutaneous injury
  - Mucous membrane exposure
  - Non-intact skin exposure
- Type and amount of fluid/tissue
  - Blood, fluids containing visible blood
  - Other potentially infectious fluid or tissue
- HBV, HCV, and HIV status of source
- Susceptibility of exposed person

# Barrier Garments



# Body Fluid Contact Caused By:

- specimen containers
- blood tubing/pumps
- feeding or ventilation tubing
- contaminated items
- direct patient contact

## Can Be Prevented By:

gloves  
masks  
gowns  
goggles



# Why safety goggles don't always protect from blood splashes



- Goggles and faceshields have been shown to be effective in reducing blood exposures to eyes
- But they can fail to protect if they slip down or leave unprotected gaps at the top or sides
- Goggles & faceshields should fit comfortably and have a foam brow band to prevent BBF from dripping into eyes



# Face shield



- No splashes over the top
- Easy to apply
- Anti-fog mask helps

# Mask/Shield



# Mucocutaneous exposures:

## Some facts to keep in mind

- In one study, circulating nurses had almost as many eye exposures as scrub nurses, because blood and body fluid can splash and spray significant distances.
- One Italian HCW was infected with HIV *and* HCV from 0.5 ml splash to eye of blood from AIDS patient.
- One ml of blood from a patient with active HBV may contain from one million to one billion viral particles. (CDC)

# Incidence of glove perforation:

- **Multiple studies, various specialties:**

Procedures with single glove.....**30-50%**

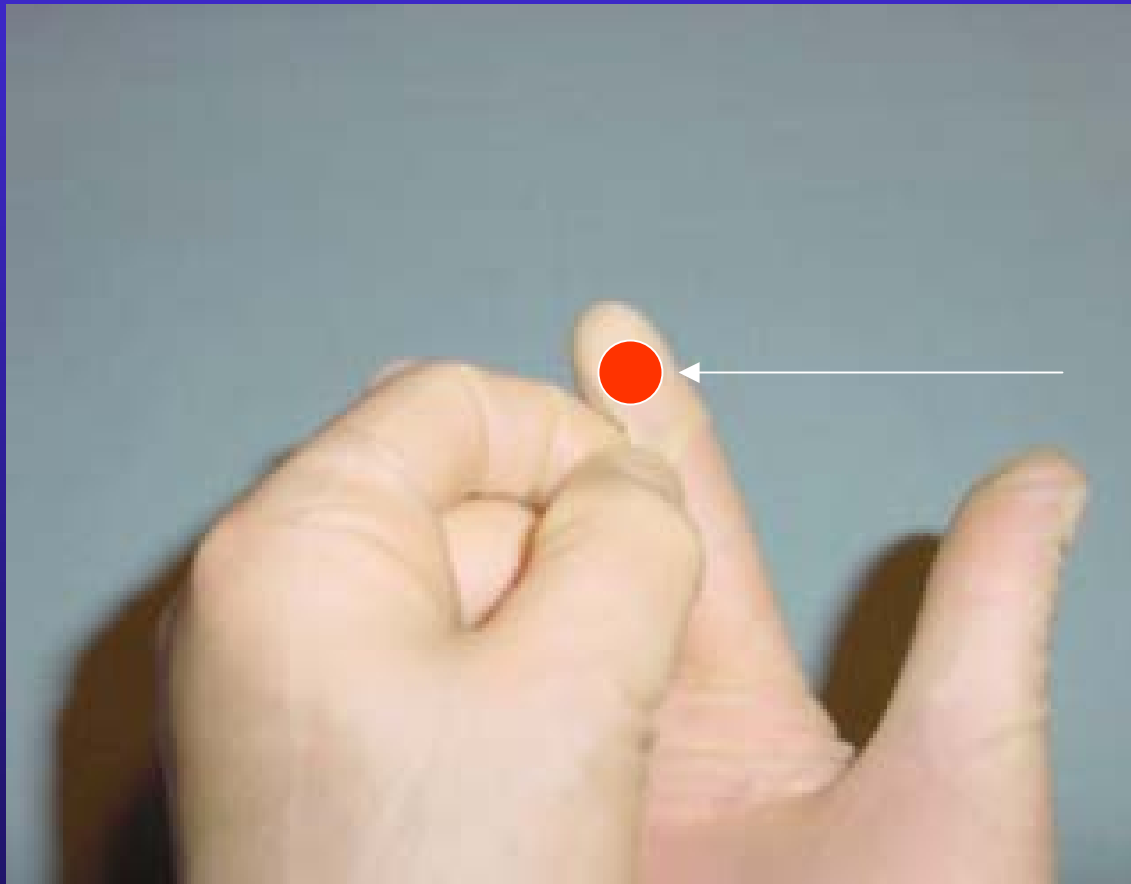
- **Single versus double glove comparison:**

Single gloving.....**35%**

Double gloving, outer glove.....**27%**

Double gloving, inner glove.....**4%**

**“Do you want to change  
that outer glove?”**



**Visible  
color  
change  
(blood or  
indicator),  
or visible  
hole/tear in  
glove**